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# The Trophic Ecology and Habitat of the Gulf of Mexico Bryde's Whale (*Balaenoptera edeni*)

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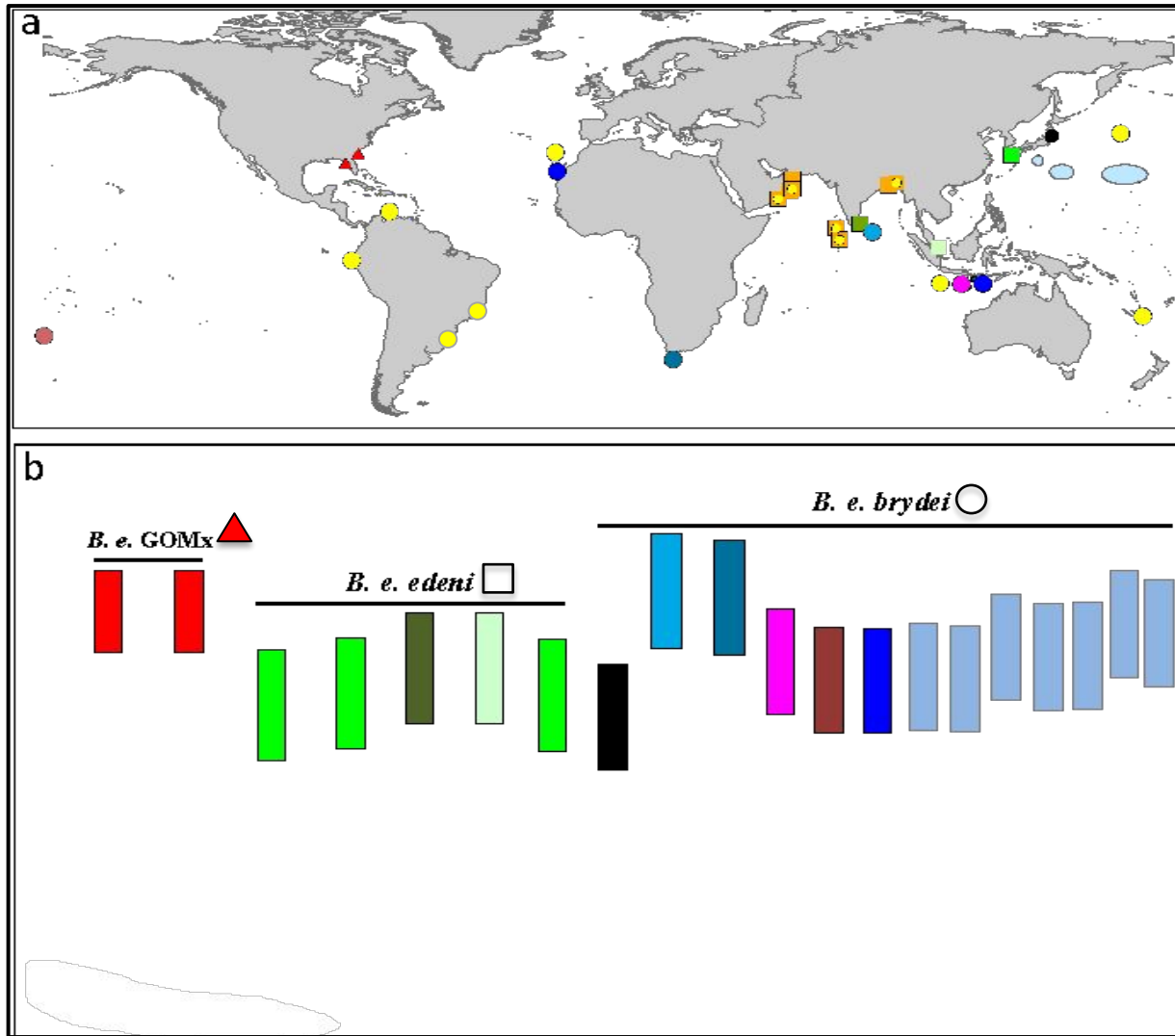
**Funded by: NOAA RESTORE Science Program**

# Gulf of Mexico Bryde's Whales

- Only resident baleen whale in Gulf of Mexico
- First noted in northern Gulf of Mexico in 1965
- Taxonomy and systematics place it in the Bryde's whale complex
- Best estimate of abundance is  $N=33$   $CV=1.07$
- Proposed to be listed under Endangered Species Act in 2017
- Potential threats include vessel traffic, fishery interactions, and noise
- 48% of habitat exposed to DWH oil



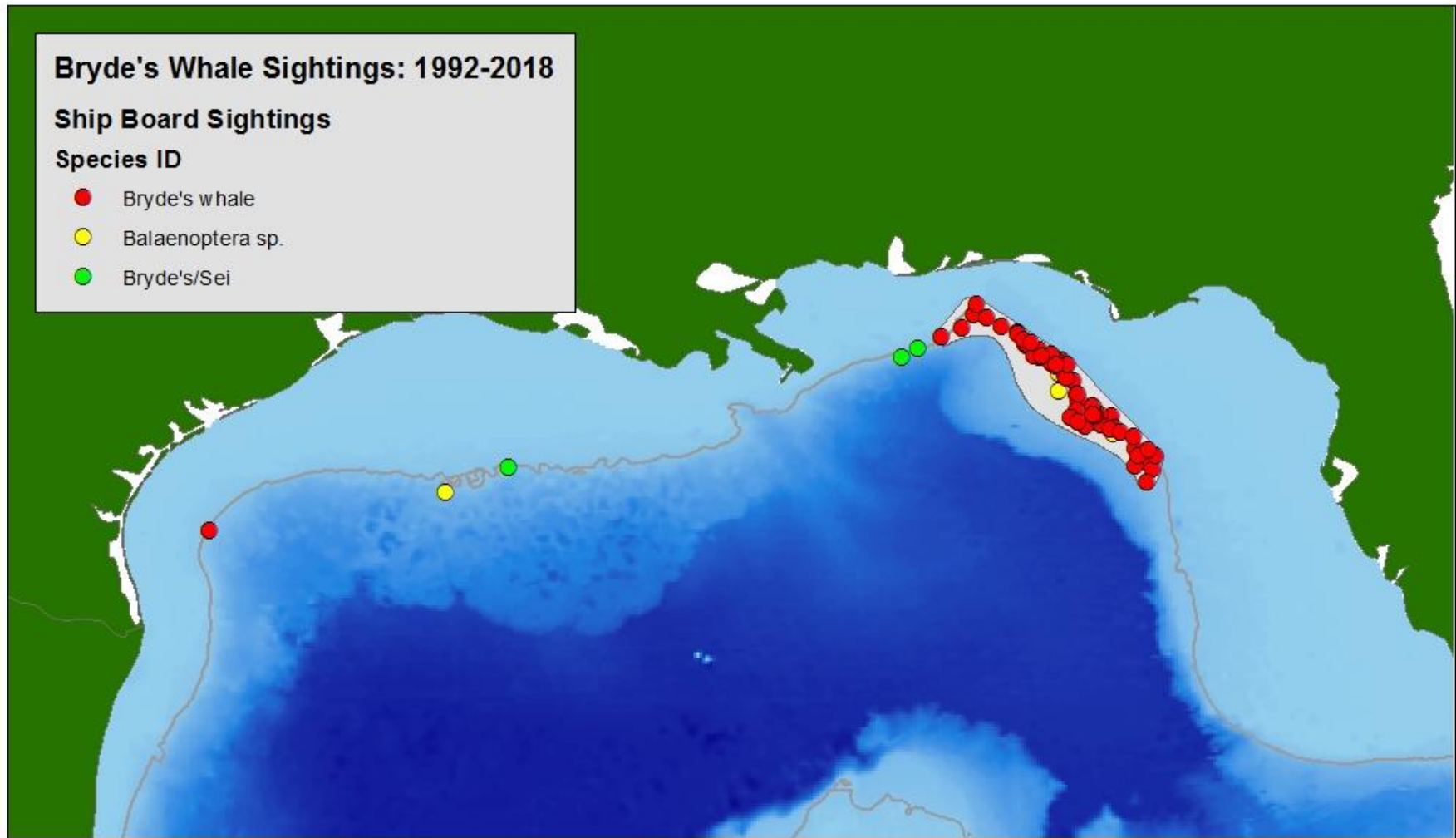
# Gulf of Mexico Bryde's Whales



- More closely related to “Eden’s whales”
- Genetically distinct from other Bryde’s whales in the Atlantic
- Possibly a distinct species

Rosel and Wilcox, 2014 *Endangered Species Research* 25: 19-34

# Gulf of Mexico Bryde's Whales - Distribution



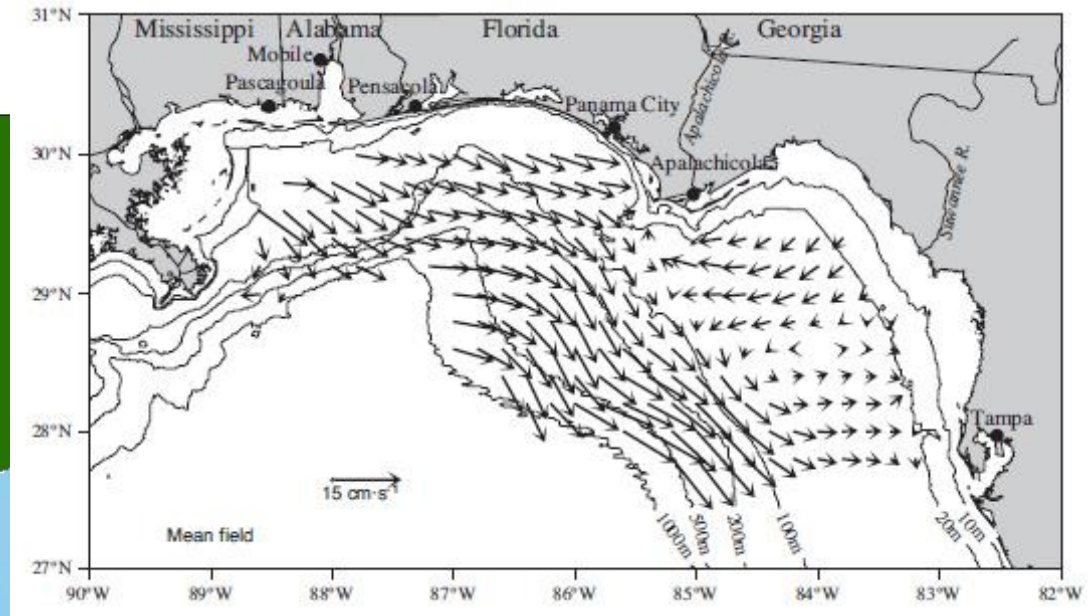
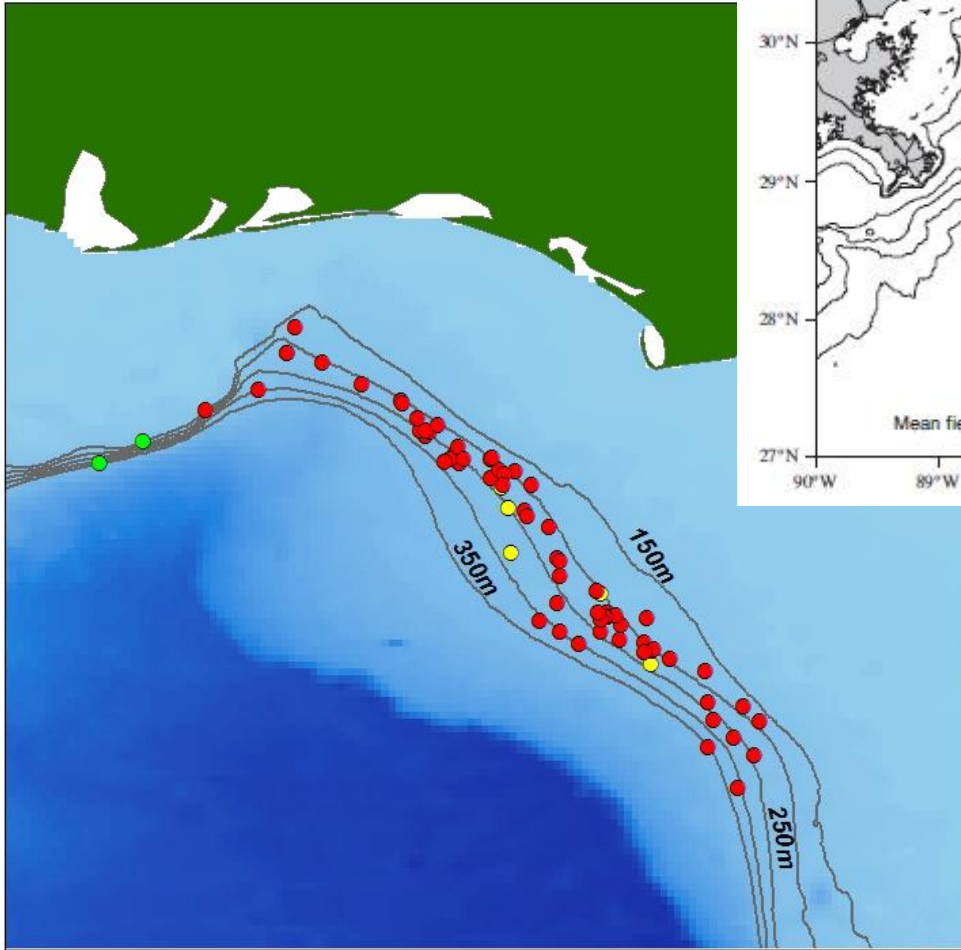
**Restricted habitat with nearly all sightings off the coast of Florida**





# Gulf of Mexico Bryde's Whales - Distribution

*Jochens et al 2002*



- Sightings concentrated in 200-250m depth range
- Region of persistent along-shelf flow and likely concentration of productive shelf water

# NOAA RESTORE Science Program Project

Understand the trophic ecology and habitat of Gulf of Mexico Bryde's whales

- Habitat preferences and spatial distribution
- Foraging behavior
- Identify major prey types and correlates to physical features



# Active Acoustics to Study Prey Distribution

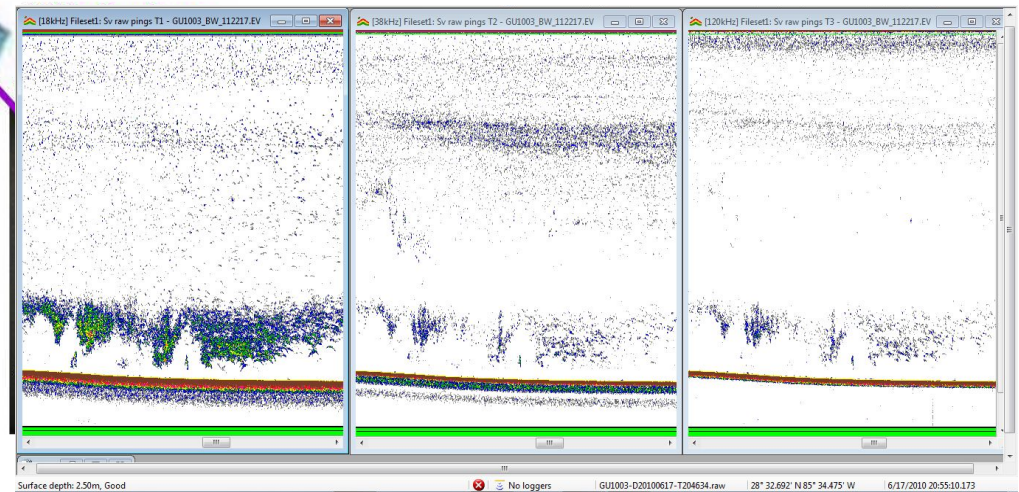
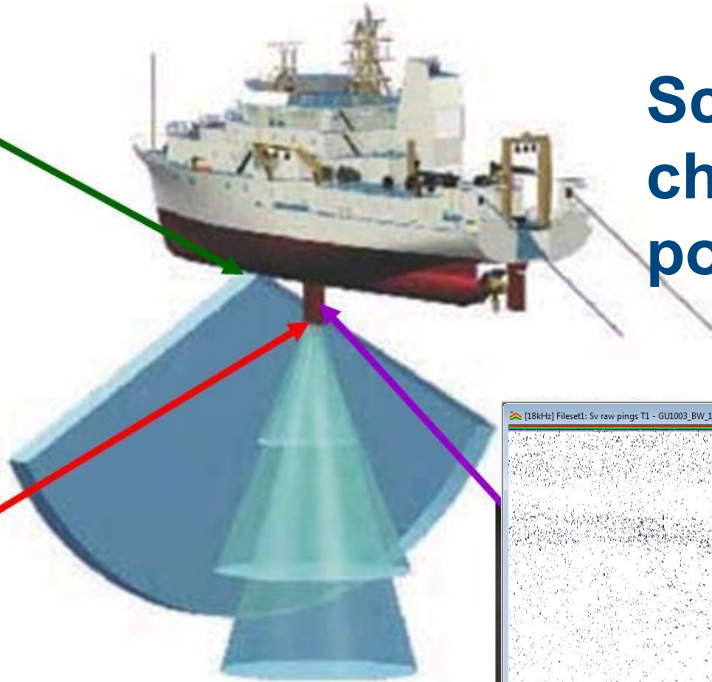
**Scientific Echosounders to characterize distribution of potential prey**



SIMRAD ME70 multibeam located on the hull



SIMRAD EK60 transducers (5) located on bottom of centerboard

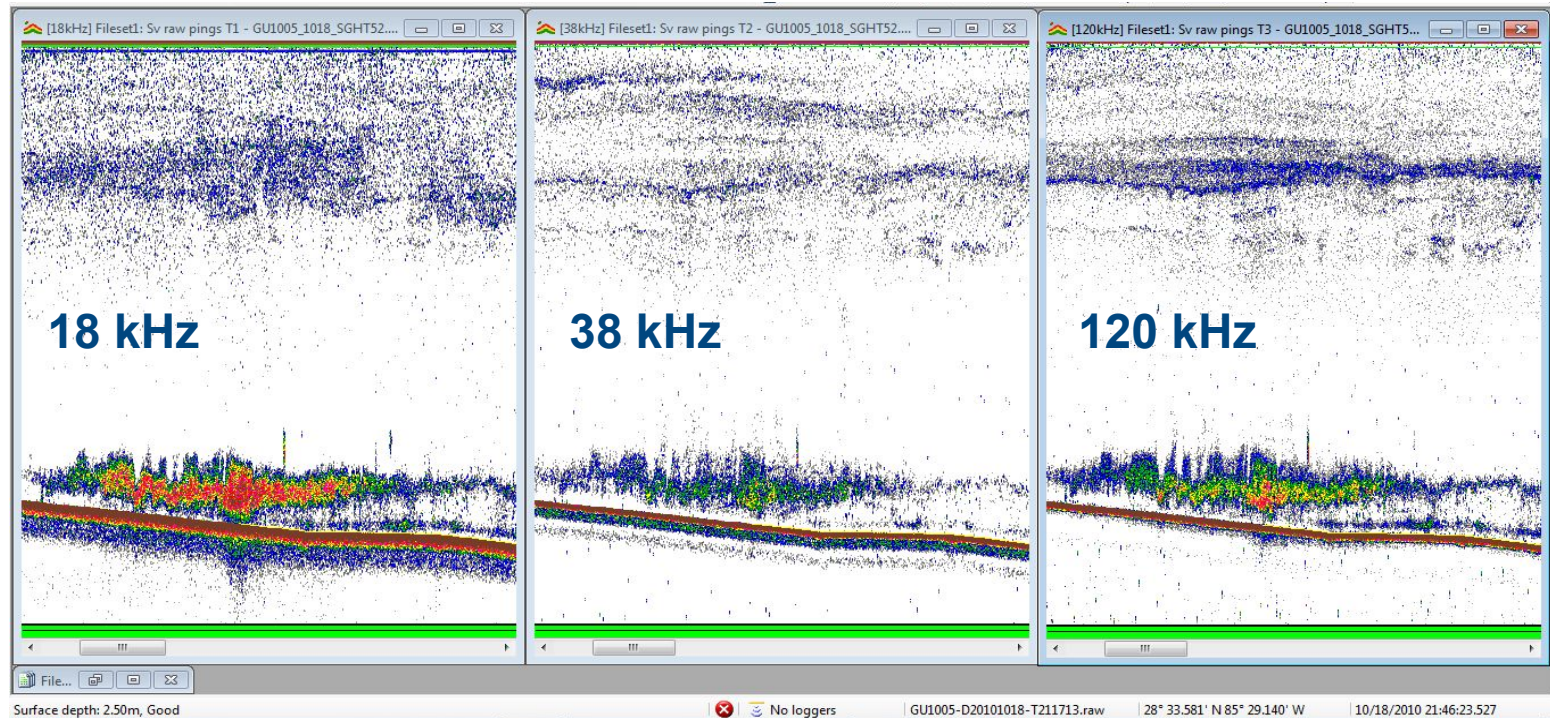


**Shipboard sonar at 18 kHz, 38 kHz, and 120 kHz frequencies**



# Potential Prey Distribution

- Acoustic data collected during summer 2010, fall 2010, and summer 2015

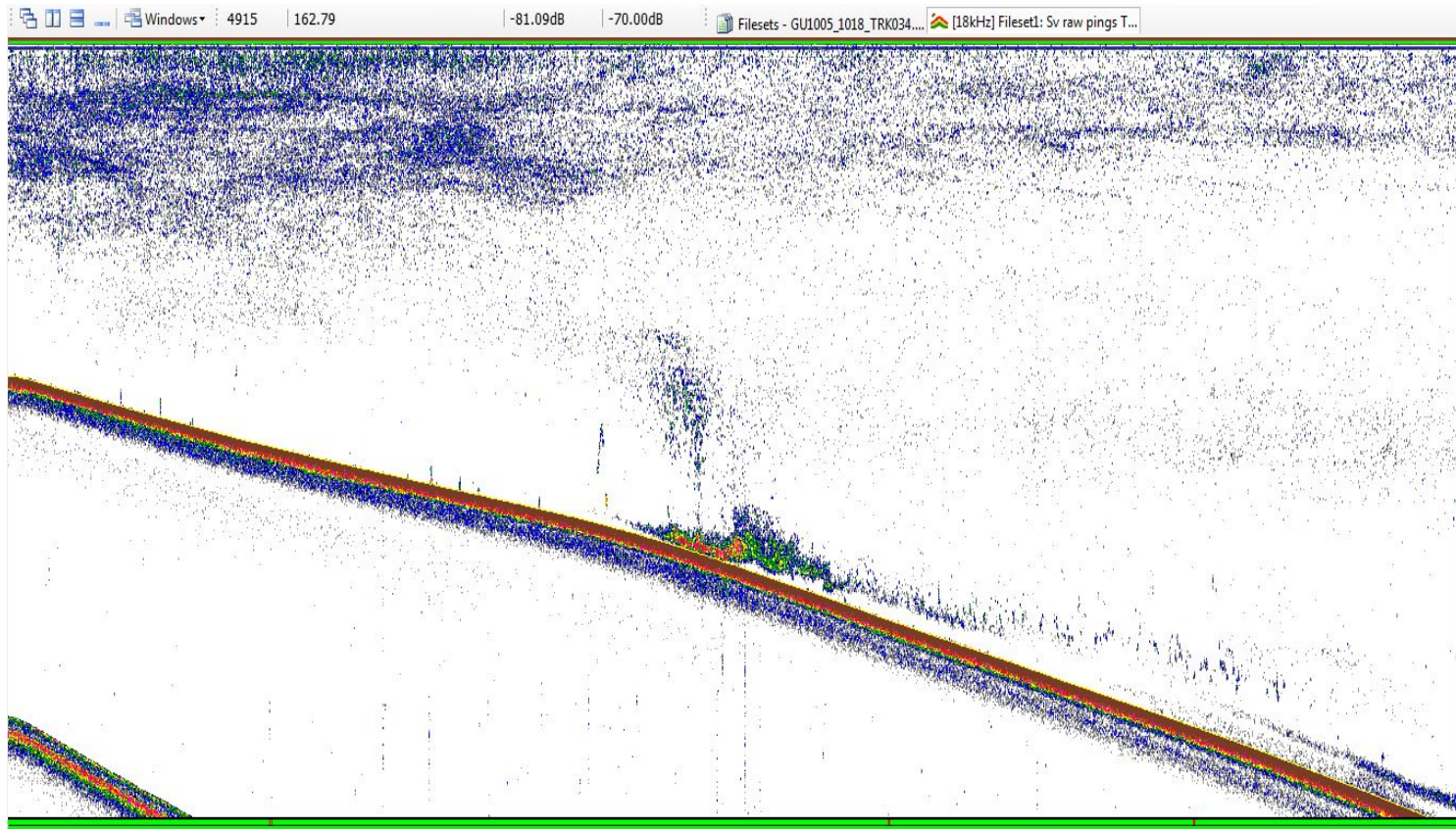


- Aggregations just above bottom typically at depths from 185m to 215m



# Potential Prey Distribution

- Frequently discrete in the 190-220m depth range
- Animals migrate vertically and disperse at night

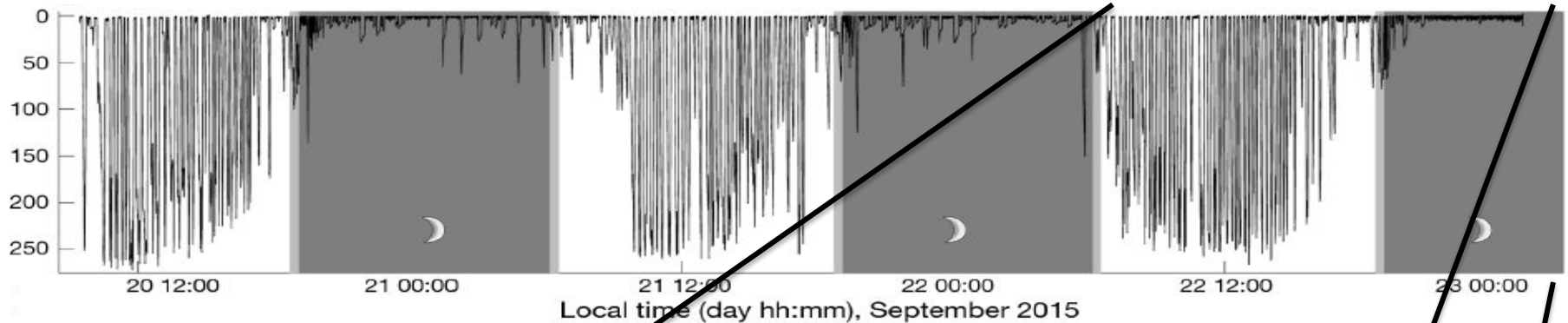


# Animal Borne Tags to Study Foraging Behavior

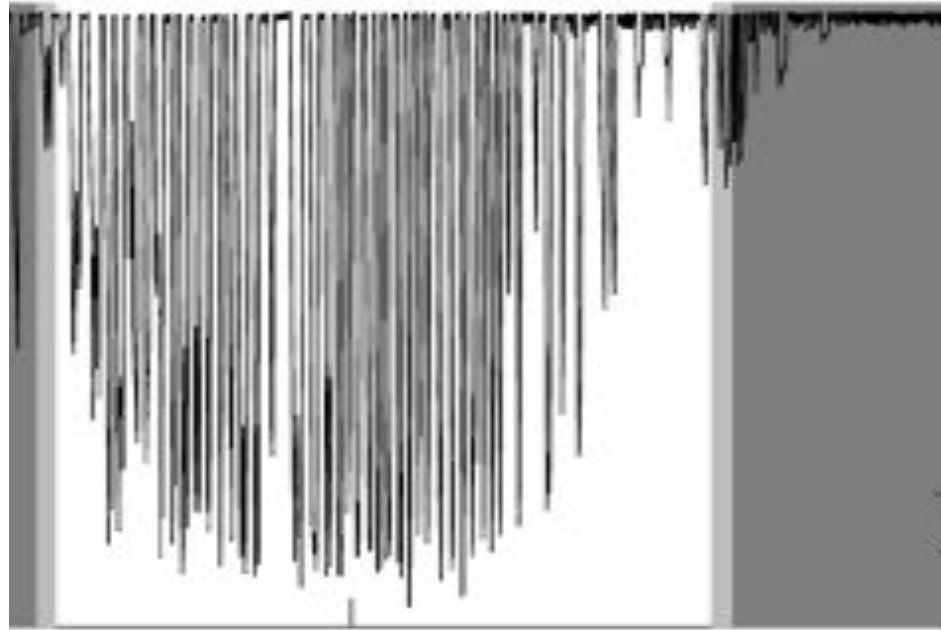


- Short deployment (~24 hrs) suction cup tags (Acousonde)
- Record vertical and horizontal movement in three dimensions

# Tag Attachment – Summer 2015



- Diel foraging pattern
- Regular feeding dives to depths of 200-250 meters, 7-8 minute duration
- 1-2 feeding lunges at depth
- Shallower dives at dusk

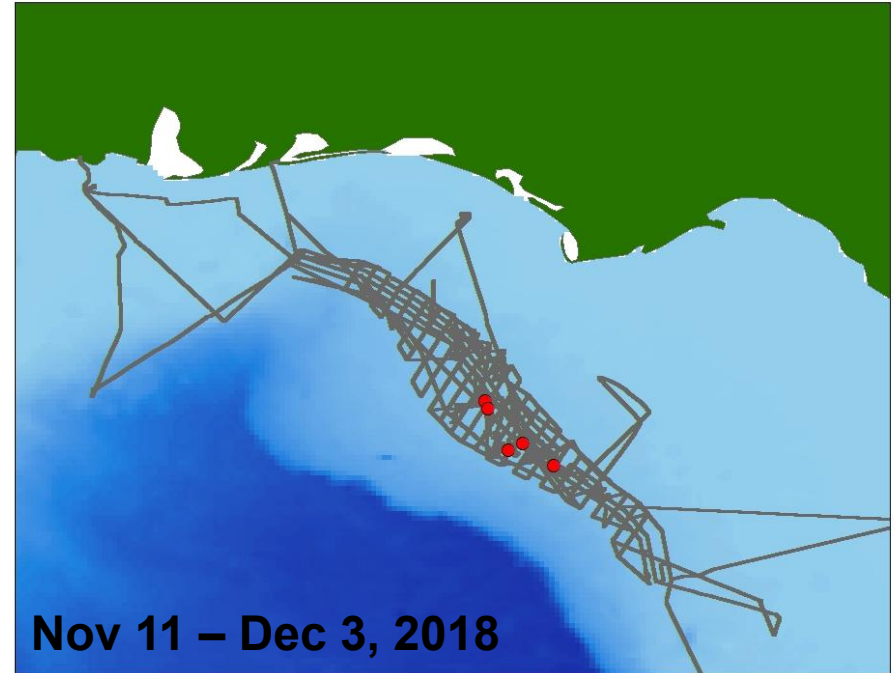
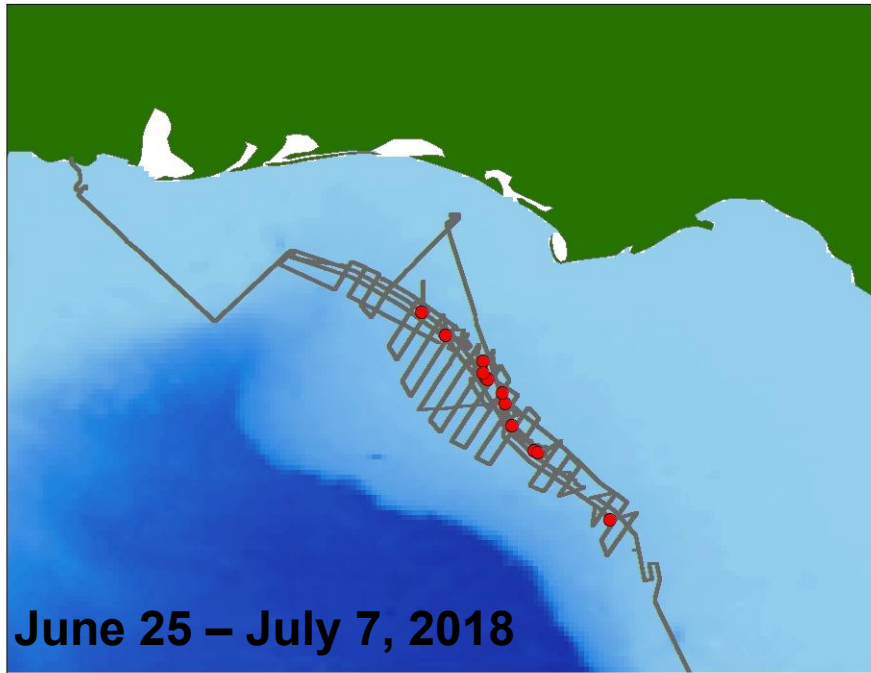


*Soldevilla et al, 2017 ESR 32: 533-550*





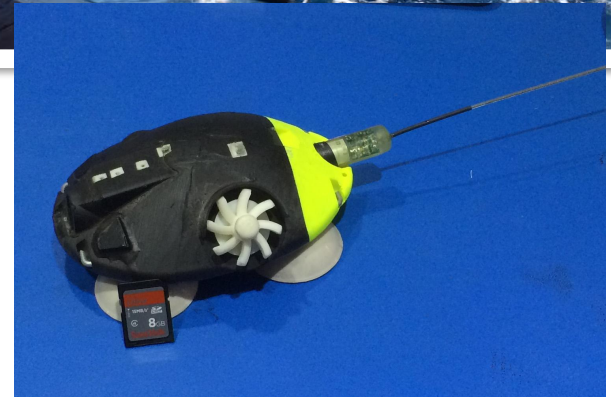
# Ongoing Trophic Ecology Cruises



- Cross-shelf and along-shelf acoustic transects
- Visual and passive acoustic surveys for whale occurrence/distribution
- Attempts to deploy additional animal borne tags including camera tag
- Biopsy sample collection, eDNA collection, Photo-id data, and Phys O data

# Summer 2019 Trophic Ecology Cruise and Ongoing Analysis

- 60 day cruise planned during June-July
- Net sampling of prey to pair with echosounder data
- Continue to attempt to deploy camera tags and additional behavior tags
- Exploring UAS deployment to characterize body condition
- Stable isotope analysis from skin biopsy samples and fish/prey samples to characterize diet

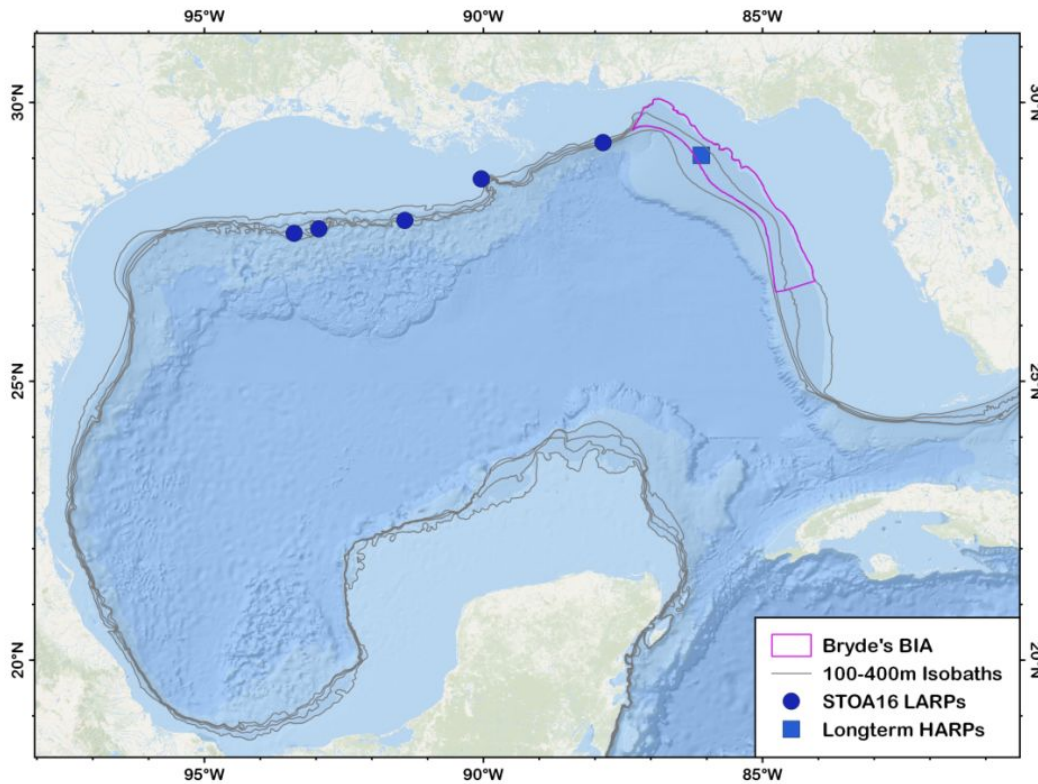


# Summary and Questions

- **Bryde's whale foraging characterized by regular, day-time dives with 1-2 feeding lunges at depth**
- **Near bottom prey aggregations with concentration in the 185-215m depth range**
- **Net towing and stable isotope analyses will indentify primary prey species**
- **Inter-annual and inter-season differences in prey availability?**
- **What is the overall energetic status of this population?**



# Wider distribution in the Gulf? Passive Acoustic Studies



**Bottom moored units can be deployed for 6 months or longer. Recovered to analyze data for whale sounds**



# Acknowledgements

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